

Claims

What is claimed is:

1. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway, the doorway defined within a side-wall of the aircraft, the side-wall including an inner wall defining an interior surface of the side-wall and an outer wall defining an exterior surface of the side-wall, the inner wall and the outer wall disposed in a spaced-apart arrangement one relative to the other, so as to define at least a space therebetween, the system comprising:

a transmitter disposed within the at least a space of the side-wall for providing an electromagnetic signal for use during an operation for aligning the one end of the passenger loading bridge to the doorway of the aircraft;

a receiver disposed about a point having a known location relative to the one end of the passenger loading bridge, for receiving the electromagnetic signal transmitted from the transmitter, and for providing an electrical output signal relating to the electromagnetic signal;

a bridge controller in electrical communication with the receiver, for receiving the electrical output signal provided from the receiver, for determining a next movement of the one end of the passenger loading bridge in a direction toward the doorway of the aircraft based upon the electrical output signal, and for providing a control signal relating to the determined next movement; and,

a drive mechanism in communication with the bridge controller, for receiving the control signal therefrom, and for driving the one end of the passenger loading bridge in the determined direction toward the doorway of the aircraft.

2. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the at least a space is disposed within a portion of the side-wall that is adjacent to the doorway of the aircraft.

3. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the at least a space is accessible via an opening defined through the interior surface of the side-wall.

4. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the at least a space is accessible via an opening defined through the exterior surface of the side-wall.
5. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the transmitter comprises an optical transmitter.
6. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 5, wherein the optical transmitter comprises a light source for providing the electromagnetic signal including light within a predetermined region of the electromagnetic spectrum.
7. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 6, wherein the predetermined region of the electromagnetic spectrum is selected from the group consisting of: the infrared region; the visible region; and, the ultraviolet region.
8. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 6, wherein the receiver comprises an optical receiver including a detector element for detecting the electromagnetic signal including light within the predetermined region of the electromagnetic spectrum.
9. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 6, wherein the opening defined through the exterior surface of the side-wall comprises a window that is transmissive to the light within the predetermined region of the electromagnetic spectrum.
10. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the transmitter comprises a radio-frequency transmitter.
11. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 10, wherein the receiver comprises a radio-frequency receiver.
12. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 11, wherein the radio-frequency receiver includes a directional

antenna for use in determining a direction from the location of the radio-frequency receiver to a location of the radio-frequency transmitter.

13. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 12, wherein the directional antenna includes two antennas for use in triangulation to determine the location of the radio-frequency transmitter.

14. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, comprising a processor in electrical communication with the transmitter, for receiving ancillary information relating to the aircraft and for providing to the transmitter an electrical signal encoded with data corresponding to the ancillary information and relating to the electromagnetic signal.

15. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 14, comprising a data entry device in operative communication with the processor for supporting entry of the ancillary information by a user aboard the aircraft.

16. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 14, comprising a sensor in operative communication with the processor, for sensing information relating to an interior of a cabin of the aircraft and for providing to the processor a signal relating to the sensed information.

17. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 16, wherein the sensor comprises a temperature sensor.

18. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 14, comprising a temperature sensor in communication with the processor, for sensing information relating to an internal temperature of the aircraft and for providing to the processor a signal relating to the sensed information.

19. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, comprising a temperature sensor in communication with the transmitter, for sensing information relating to an internal temperature of the aircraft and for providing to the transmitter a signal relating to the sensed information.

20. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 10, comprising a memory circuit in electrical communication with the processor for retrievably storing the ancillary information for access by the processor.
21. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the receiver is mounted to a portion of the passenger loading bridge.
22. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, wherein the receiver is mounted to a portion of the passenger loading bridge proximate the one end thereof.
23. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 1, comprising a user interface disposed within a cockpit portion of the aircraft for receiving an indication from a user for initiating the operation for aligning the one end of the passenger loading bridge to the doorway of the aircraft, and for providing an electrical control signal in dependence upon receiving the indication.
24. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 23, comprising a second transmitter disposed aboard the aircraft and in communication with the user interface, the second transmitter being responsive to the electrical control signal for transmitting a second electromagnetic signal comprising an activation signal for initiating the operation for aligning the one end of the passenger loading bridge to the doorway of the aircraft.
25. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 24, wherein the user interface comprises a touch sensitive monitor for supporting both entry of information relating to the aircraft and display of information relating to the aircraft.
26. A system for aligning one end of a passenger loading bridge to an aircraft having a doorway according to claim 24, wherein the user interface comprises a manually operable switch mechanism.

27. A kit for retrofitting an aircraft, the aircraft having a space contained within a side-wall thereof, the side-wall including an interior wall defining an interior surface of the side-wall and an outer wall defining an exterior surface of the side-wall, the kit comprising:

a transmitter module for being fixedly mounted within the space between the interior wall and the exterior wall and for transmitting an electromagnetic signal within a predetermined region of the electromagnetic spectrum; and,

a mount for securing the transmitter within the space.

28. A kit for retrofitting an aircraft according to claim 27, wherein the transmitter module comprises a light source for providing the electromagnetic signal comprising light within a predetermined region of the electromagnetic spectrum.

29. A kit for retrofitting an aircraft according to claim 28, comprising a light transmissive window for being disposed in the outer wall and adjacent to the space, and for propagating the light within a predetermined region of the electromagnetic spectrum between the space and a region that is external to the space.

30. A kit for retrofitting an aircraft according to claim 28, wherein the light source is selected from the group consisting of: an infrared light source, an ultra-violet light source; and, a visible-light source.

31. A kit for retrofitting an aircraft according to claim 27, wherein the transmitter comprises a radio-frequency transmitter for providing the electromagnetic signal.

32. A kit for retrofitting an aircraft according to claim 27, wherein the mount comprises an electrical connector configured for connecting the transmitter module to an on-board power system of the aircraft.

33. A kit for retrofitting an aircraft according to claim 27, wherein the mount comprises a lamp receptacle adapted for receiving the transmitter module.

34. A kit for retrofitting an aircraft according to claim 27, comprising a processor in electrical communication with the transmitter module for being disposed aboard the aircraft, for receiving ancillary information relating to the aircraft and for providing to the transmitter module

an electrical signal encoded with data corresponding to the ancillary information and relating to the electromagnetic signal.

35. A kit for retrofitting an aircraft according to claim 34, comprising a data entry device in operative communication with the processor for supporting entry of the ancillary information by a user aboard the aircraft.

36. A kit for retrofitting an aircraft according to claim 34, comprising a memory circuit in electrical communication with the processor for retrievably storing the ancillary information for access by the processor.

37. A method of retrofitting an aircraft having a doorway, the aircraft having a space contained within a side-wall thereof, the side-wall including an interior wall defining an interior surface of the side-wall and an outer wall defining an exterior surface of the side-wall, the method comprising:

- providing an opening in the exterior surface of the side-wall at a point proximate the doorway, the opening sized for accepting a housing;

- mounting a housing within the opening;

- securing a transmitter module to the housing;

- providing an electrical connection between the transmitter module and an on-board power system of the aircraft; and,

- securing a cover adjacent to the opening, so as to provide a surface that is substantially continuous with the exterior surface of the side-wall.

38. A method of retrofitting an aircraft having a doorway according to claim 37, wherein mounting a housing within the opening comprises riveting the housing within the opening, the housing configured for receiving the transmitter module.

39. A method of retrofitting an aircraft having a doorway according to claim 37, wherein providing an opening comprises cutting a hole through the exterior surface of the side-wall, the hole dimensioned for receiving the housing therein.

40. An apparatus for aligning one end of a passenger loading bridge to an aircraft having a doorway, the doorway defined within a side-wall of the aircraft, the side-wall including an

interior wall defining an interior surface of the side-wall and an outer wall defining an exterior surface of the side-wall, the aircraft having a space contained within the side-wall, the apparatus comprising:

a mounting structure; and,

a transmitter for being fixedly mounted, via the mounting structure, at a location within the space between the interior wall and the exterior wall, the transmitter for wirelessly providing a signal within a predetermined region of the electromagnetic spectrum, the signal comprising information relating to a location of the doorway relative to the location of the transmitter.